[Designation of Document] Abstract

A substrate in a parallelepiped plate form satisfies an interference condition when incident light has a wavelength (λ) fallen under the following (d: thickness, n: refractive index, θ: incident angle, N: integer).

[Equation 7]

$$\frac{2nd\sqrt{1-\left(\sin\theta/n\right)^2}}{\lambda} = N$$

At this time, the light in a transmission spectrum is intensified to cause a fringe peak to appear, whereas the light in a reflection spectrum is weakened to provide a fringe valley. At around the wavelength (frequency), as the incident angle is increased, the transmittance nears zero while reflectance increases nearing 1. Increasing the thickness of the substrate by placing a thin film thereon is similar to the increase in the substrate thickness in [Equation 7], whereby the wavelength satisfying the interference condition shifts toward the longer wavelength (lower frequency). Due to the three effects, at a great incident angle, a ratio of an optical (transmission or reflection) spectrum of a system having a substrate and thin film to an optical spectrum of a substrate only becomes a spectrum having a structure wherein maximum and minimum values are adjacent to each other. By analyzing this relative transmission spectrum or relative reflection spectrum, a complex dielectric constant of the thin film can

be determined.